invention. Specifically, the Examiner stated that the term "optionally" renders the claim indefinite. Applicants respectfully traverse.

The word "optionally" is an alternative format which is permitted when there is no ambiguity as to which alternatives are covered by the claim. See MPEP at § 2173.05(i). Although Applicants believe there is no ambiguity as to which additional additives may be included, Applicants have deleted the "optionally" language from claim 1 and rewritten claim 13 to recite the phrase "further comprising." Thus, Applicants respectfully request that this rejection be withdrawn.

Claims 1, 4, 6, and 9-15 have been rejected under 35 U.S.C. § 102(e) as being anticipated by Wehlage et al. (US 5,951,841). Applicants respectfully traverse.

Applicants' claimed invention is directed to an electrolyte composition for and method for depositing tin or tin-alloy on a substrate, the composition comprising one or more tin compounds, one or more acidic electrolytes, one or more alkylene oxide compounds, one or more polyalkylene glycols and *one or more reducing agents*. Thus, a *combination* of one or more alkylene oxide compounds and one or more polyalkylene glycols and one or more reducing agents is required by Applicants' claims.

Wehlage et al. are directed to salts of aromatic hydroxy compounds used as brighteners in acidic electroplating baths, particularly zinc electroplating baths. The electroplating baths of Wehlage et al. contain "one or more metal salts, one or more brighteners, if required one or more conductive salts and, if required, one or more auxiliary brighteners, wherein at bath comprises, as brighteners, at least one of" the aromatic hydroxy compounds disclosed at columns 2-6 of the Wehlage et al. patent. See Wehlage et al. at column 6, lines 40-48. Wehlage et al. do not disclose reducing agents. Accordingly, Wehlage et al. fail to disclose a combination of Applicants' alkylene oxide compounds with polyalkylene glycols in a tin electroplating bath further containing a reducing agent. Thus, Applicants' claimed invention is not anticipated by Wehlage et al. and Applicants respectfully request that this rejection be withdrawn.

Claims 5, 8 and 16 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Wehlage et al. (US 5,951,841). Applicants respectfully traverse.

The Examiner acknowledged that Wehlage et al. fail to disclose an acidic electrolyte in the range of 10 to 400 g/L, an alkylene oxide compound in the range of 0.1 to 15 mL/L, and a plating method using a current density in the range of 1 to 2000 ASF. As discussed above, Wehlage et al. fail to disclose reducing agents. As Wehlage et al. do not disclose reducing agents, neither do they disclose the need for such reducing agents. One skilled in the art reading this patent would *not* be lead to add reducing agents to the electroplating baths of Wehlage et al. Thus, tin and tin alloy electroplating baths containing a combination of one or more alkylene oxide compounds and one or more polyalkylene glycols and one or more *reducing agents* are neither disclosed nor suggested by Wehlage et al. Specifically, such electroplating baths containing an acidic electrolyte in the range of 10 to 400 g/L or containing an alkylene oxide compound in the range of 0.1 to 15 mL/L are not disclosed or suggested by Wehlage et al. Further, methods for depositing tin or tin-alloy from such electroplating baths containing a reducing agent and using a current density in the range of 1 to 2000 ASF are neither disclosed nor suggested by Wehlage et al. Thus, Applicants respectfully submit that the Examiner has not made out a prima facie case of obviousness and respectfully request that this rejection be withdrawn.

Claim 17 has been rejected under 35 U.S.C. § 103(a) as being unpatentable over Federman et al. (US 5,174,887) in view of Wehlage et al. (US 5,951,841). Applicants respectfully traverse.

One of the problems to be solved by Applicants invention is to maintain a consistent tin or tin-alloy deposit thickness, i.e. coating weight, during slow down periods in high speed tin plating. During use, a high speed tinplate line may slow down, such as when a new metal coil is welded to the end of the metal strip that is being plated. During such slow down periods the rate at which the metal substrate passes through the electroplating bath slows down. Theoretically, in order to maintain a consistent tin or tin-alloy deposit thickness, i.e. coating weight, the plating bath must be run at a lower current density. Conventional tin and tin-alloy high speed electroplating baths fail to produce a consistent appearance of tin or tin-alloy over a sufficiently wide current density range to allow for such slow down periods. Applicants have surprisingly found that a tin or tin-alloy electroplating bath containing one or more tin compounds, one or

more acidic electrolytes, one or more alkylene oxide compounds, one or more polyalkylene glycols and one or more reducing agents provides high speed tin deposits at a sufficiently wide range of current densities to maintain a uniform tin deposit during slow down periods, without generating foam or sludge.

Federman et al. disclose a process for the high speed electroplating of tin having as a surfactant an alkylene oxide *condensation product* of an organic compound having at least one hydroxy group and 20 carbon atoms or less. Only alkylene oxide condensation products are taught in Federman et al. as being suitable for use in high speed tin plating. Accordingly, no other wetting agents are disclosed in this patent. Thus, nothing in Federman et al. teaches or suggests the use of a combination of wetting agents. Specifically, this patent neither teaches nor suggests the use of polyalkylene glycols. Since polyalkylene glycols are neither taught nor disclosed, combinations of one or more alkylene oxide compounds and one or more polyalkylene glycols are neither taught nor disclosed in Federman et al. In fact, Federman et al. at col. 3, lines 51-54 state that "[o]nly a limited number of such wetting agents can satisfy all the requirements listed [in Federman et al.] for optimum high speed electroplating in a clear solution without generating foam or sludge." This statement would lead one skilled in the art to conclude that the use of other wetting agents in high speed tin plating would generate foam or cause sludge, both of which are to be avoided. Thus, there is nothing in Federman et al. that would lead one skilled in the art to expect a combination of one or more alkylene oxide compounds with one or more polyalkylene glycols would produce a tin or tin-alloy electroplating bath that provides a consistent appearance of tin or tin-alloy over a sufficiently wide current density range to allow for slow down periods during the electroplating process. Such a result could not be predicted by one skilled in the art reading Federman et al.

Wehlage et al. fail to fill the deficiencies of Federman et al. Wehlage et al. are discussed above. There is nothing in Wehlage et al. that teaches or suggests high speed tin plating. Further, nothing in this patent teaches or suggests problems in high speed tin plating, such as slow down periods. Thus, Wehlage et al. fail to suggest a solution to the problem of tin and tin-alloy deposit appearance during slow down periods in high speed plating processes.

As discussed above, Federman et al. teaches that only a limited number of surfactants are suitable for use in high speed tin plating, specifically only alkylene oxide condensation products.

If one were to combine Federman et al. with Wehlage et al., one would at best use the aromatic hydroxy brightener compounds of Wehlage et al. in the plating baths of Federman et al. There is nothing in the combination of these references that would lead one skilled in the art to *select* a polyethylene glycol from the list of possible surfactants in Wehlage et al. and combine it with the plating bath of Federman et al. in the expectation of providing a consistent appearance of tin or tin-alloy over a sufficiently wide current density range to allow for slow down periods during a high speed tin electroplating process. Such a result could not be predicted from a combination of these references. Thus, Applicants submit that the Examiner has not made out a prima facie case of obviousness and respectfully request that this rejection be withdrawn.

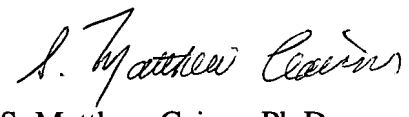
Claims 2, 3 and 7 have been rejected under 35 U.S.C. § 102(e) as anticipated by, or in the alternative, under 35 U.S.C. § 103(a) as being unpatentable over Wehlage et al. (US 5,951,841). Applicants respectfully traverse.

Wehlage et al. are discussed above. This patent fails to disclose a reducing agent in tin electroplating baths. Thus, this patent fails to disclose a tin or tin-alloy electroplating bath containing a combination of one or more alkylene oxide compounds and one or more polyalkylene glycols and one or more reducing agents. Thus, claims 2, 3 and 7 are not anticipated by Wehlage et al.

As discussed above, Wehlage et al. fail to disclose reducing agents at all. As Wehlage et al. do not disclose reducing agents, neither do they disclose the need for such reducing agents. One skilled in the art reading this patent would not be lead to add reducing agents to the electroplating baths of Wehlage et al. Thus, tin and tin alloy electroplating bath containing a combination of one or more alkylene oxide compounds and one or more polyalkylene glycols and one or more *reducing agents* are neither disclosed no suggested in Wehlage et al. Accordingly, Applicants respectfully submit that the Examiner has not made out a prima facie case of obviousness and respectfully request that this rejection be withdrawn.

In view of the foregoing, favorable reconsideration in the form of a notice of allowance is respectfully requested.

Respectfully submitted,



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Date: July 26, 2001

A1

1. (Amended) An electrolyte composition for depositing tin or tin-alloy on a substrate, comprising one or more tin compounds, one or more acidic electrolytes, one or more alkylene oxide compounds, one or more polyalkylene glycols and one or more reducing agents.

A2

13. (Amended) The electrolyte composition of claim 1 further comprising one or more additives selected from grain refiners or brightening agents.

A3

17. (Amended) A method for high speed electroplating of tin or tin-alloys comprising the steps of: a) utilizing high speed electroplating equipment comprising an electroplating cell; an overflow reservoir adjacent the cell; means for returning solution from the reservoir to the electroplating cell; means for directing a substrate to be plated from an entry point at one end of the cell to an exit at a second end of the cell; b) introducing an electrolyte including a basis solution of one or more tin compounds, one or more acidic electrolytes, one or more alkylene oxide compounds, one or more polyalkylene glycols, and one or more reducing agents; and c) continuously electroplating substrates with tin or tin-alloy at a sufficient current density and at a sufficient temperature for high speed electroplating as the substrates pass through the electroplating solution within the cell.

A

Attachment A2
Version Showing Changes Made

1. (Amended) ~~A~~ An electrolyte composition for depositing tin or tin-alloy on a substrate, comprising one or more tin compounds, one or more acidic electrolytes, one or more alkylene oxide compounds, one or more polyalkylene glycols and ~~optionally~~ one or more ~~additives~~ reducing agents.

13. (Amended) The electrolyte composition of claim 1 further comprising one or more ~~wherein the~~ additives ~~are~~ selected from ~~reducing agents,~~ grain refiners~~,~~ or brightening agents ~~and mixtures thereof~~.

17. (Amended) A method for high speed electroplating of tin or tin-alloys comprising the steps of: a) utilizing high speed electroplating equipment comprising an electroplating cell; an overflow reservoir adjacent the cell; means for returning solution from the reservoir to the electroplating cell; means for directing a substrate to be plated from an entry point at one end of the cell to an exit at a second end of the cell; b) introducing an electrolyte including a basis solution of one or more tin compounds, one or more acidic electrolytes, one or more alkylene oxide compounds, one or more polyalkylene glycols, and ~~optionally~~ one or more reducing agents ~~additive~~; and c) continuously electroplating substrates with tin or tin-alloy at a sufficient current density and at a sufficient temperature for high speed electroplating as the substrates pass through the electroplating solution within the cell.

Attachment B
Newly Added Claims

16. (New) The electrolyte composition of claim 1 wherein the one or more reducing agents are selected from hydroquinone, resorcinol or catechol.

18 19. (New) The method of claim 17 wherein the one or more reducing agents are selected from hydroquinone, resorcinol or catechol.

19 20. (New) An electrolyte composition for depositing tin or tin-alloy on a substrate, comprising one or more tin compounds selected from tin halides, tin sulfates, tin alkane sulfonates, tin aryl sulfonates, or tin alkanol sulfonates; one or more acidic electrolytes selected from alkane sulfonic acids, aryl sulfonic acids, sulfuric acid, sulfamic acid, hydrochloric acid, hydrobromic acid and fluoroboric acid; one or more alkylene oxide compounds selected from ethylene oxide / propylene oxide block copolymers, alkylene oxide condensation products of an organic compound having at least one hydroxy group and 20 carbon atoms or less, or compounds prepared by adding oxypropylene to polyoxyethylene glycol, wherein each of the alkylene oxide compounds has an average molecular weight of from about 500 to about 10,000; one or more polyalkylene glycols selected from polyethylene glycol or polypropylene glycol, wherein each polyalkylene glycol has an average molecular weight of from about 200 to about 100,000; and one or more reducing agents.